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Certificate

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DEPARTMENT OF TRADE AND
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This is to certify that

the annexed documents are a true copy of the provisional specification and drawings of South African Patent Application No. 2004/1357 filed on the 19th February 2004.

Geteken te **PRETORIA** in die Republiek van Suid-Afrika, hierdie **14** dag van **April 2005**

Signed at **PRETORIA** in the Republic of South Africa, this **14** day of **April 2005**

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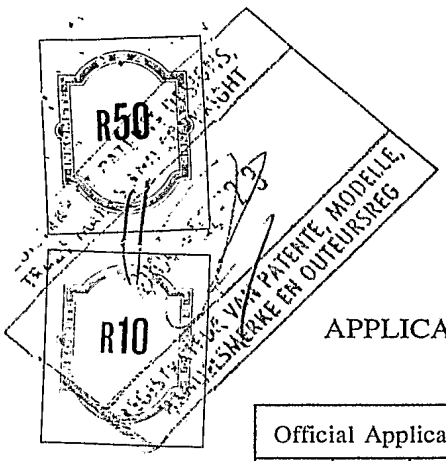

Galgut & Galgut

Johannesburg
South Africa

Form P 1

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978
APPLICATION FOR A PATENT AND ACKNOWLEDGEMENT OF RECEIPT
[Section 30(1) - Regulation 22]

Official Application No			Applicants Ref
21	10	2004/1357	84822

71		Full names of Applicant
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54		Title of invention
Core Splitter		

The application is accompanied by :-

✓	1.	A copy of a Provisional Specification of 10 pages.
✓	2.	Informal Drawings of 5 sheets
	3.	Publication Particulars and abstract
	4.	A copy of Figure of the drawings for abstract
	5.	Assignment of invention
	6.	Certified priority documents
	7.	Translation of priority documents
	8.	An assignment of priority rights
	9.	A copy of Form P2 and the specification of S A Patent Application No 21. 01.
	10	A declaration and power of attorney on Form P3
	11	Request for ante-dating on Form P 4
	12	Request for classification on Form P9
✓	13	Form P2
		Address for Service Galgut & Galgut Johannesburg

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2004 -02- 19
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Dated this 18 February 2004

Galgut & Galgut
Applicant's Patent Attorney

The duplicate will be returned to the applicant's address for service as proof of lodging but is not valid unless endorsed with official stamp

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Johannesburg
South Africa

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978
PROVISIONAL SPECIFICATION
[Section 30(1) - Regulation 27]

Official Application No	
21	01 2004/1357

Lodging Date	
22	

Full names of Applicant(s)	
71	Corstor (Proprietary) Limited

Full name(s) of inventor(s)	
72	John David Wilson

Title of invention	
54	Core Splitter

This invention relates to core splitters.

Borehole core samples which have been drilled from rock are normally of elongated cylindrical shape. When these are examined, they are often require destructive testing. In order that an accurate record sample of the core is maintained, the core is usually split along diametral planes into two or more parts so that one can be examined and the other retained as a record sample.

According to one aspect of the invention there is provided a method cutting borehole core samples comprising submerging the samples in a liquid bath and there cutting the samples.

According to another aspect of the invention there is provided a core splitter comprising a trough in which the liquid bath will in use be contained, a locating device for locating a core therein which device is located within the trough, and a cutting head to which a cutter may be attached and which can be moved along the trough to cut the core along diametral planes into two or more parts. The trough is preferably substantially watertight and the locating device is conveniently located at a position such that when the trough has an appropriate amount of water therein, the core will be below the level of the water. The head preferably runs along a linear bearing located longitudinally along the side of the trough.

The cutting head preferably comprises a rotatable cutting tool, preferably a cutting blade that is driven directly by an electric motor, and a cowling

within which the tool is contained. The cowling is preferably arranged so as to have its lower edges submerged within the bath.

The core splitter preferably comprises means for moving the head along the length of the trough. Such means preferably comprises an elongated screw member which engages in a nut that is carried by the head and which, when rotated, moves the head.

According to another aspect of the invention there is provided a core holder in which the core is carried in the aforesaid core splitter during the aforesaid method, the core holder being of polygonal and preferably hexagonal section and dimensioned to hold the core firmly, the core holder having a slot at its upper end through which the cutter can enter the core holder to cut the core. At the lower end, the core holder is preferably provided with slots through which the cuttings and other detritus formed during the cutting operation can pass into the trough. The lower portion of the core holder is preferably shaped to correspond to the locating device so as to be firmly held in position thereby.

An embodiment of the invention will now be described by way of example with reference to the accompanying drawings.

In the drawings:-

Figure 1 is a side view of a core splitter of the invention showing the means for moving the head along the trough,

Figure 2 is a side view of the core splitter from the opposite side,

Figure 3 is an end view of the core splitter,

Figure 4 is an enlarged detail section of the core splitter, the section being taken on line 4-4 of Figure 1,

Figure 5 is an enlarged detail of Figure 4, and

Figures 6 and 7 are respectively a perspective view and a side view of a core holder for holding the core during the cutting operation.

Referring now to the drawings, there is shown a core splitter 10 of the invention. The core splitter 10 comprises a trough 12 containing a water bath 14 in the trough and a movable cutting head 16. The core splitter works with various sized core holders that hold the cores securely during the cutting operation as will be described below.

The trough 12 is formed of sheet steel and is mounted on a pair of legs 18 located at one side of the trough inset from the ends of the trough 12 which are closed. The trough 12 is of rectangular cross-section. The base 20 of the trough 12 is of shallow "V"-shape. A drain cock 21 is provided at the lower corner 22 of the base 20 to enable the cuttings and grindings that have settled to be drained from the trough.

Each side wall 24 and 26 of the trough 12 is provided at its upper end with an inwardly directed flange 28 having a short dependent rib 30 at its inner end. This arrangement helps contain within the trough water that is disturbed during the cutting operation.

Within the trough 12 are a pair of spaced transverse vertical walls 32 on the facing surfaces of which are respectively a pair of upwardly open "V"-shaped support members 34 (see Figures 4 and 5) the arms of which are at right angles to one another and 45° to the vertical. This members 34 act as a locating device for a core within a core holder as will be described more fully below. A vertical slot 36 extends from the upper edge of each wall 32 to slightly above the lower corner 38 of each member 34.

Bolted to the outside of one side wall 24 is a robust horizontal guide member 40 that extends from one end of the trough 12 to the other. The guide member 40 has support surfaces 42 on its upper and lower faces. An elongated screw 44 runs parallel to the guide member 40 being rotatably carried at its ends by journals 46. A small electric motor 48 is connected to the screw 44 through a drive mechanism 50 to rotate this for the purpose which will be described.

The cutting head 16 comprises a robust chassis 52 having a vertical side plate 54 extending besides the side wall 24 and a horizontal plate 56 extending away from the trough 12. A pair of gusset plates 58 connect the vertical and horizontal plates 52 and 54 to provide extra robustness. The vertical side plate 52 carries a pair of linear bearings 60 that engage the guide member 40. Each linear bearing 60 has two sets of recirculating ball bearings 62 which run in the grooves 42 so that the head 16 may be movable along the guide member 40 and held vertical during such movement.

An electric motor 64 is mounted on the horizonal plate 56. The motor 64 has a horizontal drive shaft 66 extending transversely to the trough 12. This shaft 66 carries a clamping device 68 whereby a diamond cutting blade 70 may be secured to the shaft 66 so as to be rotated by the motor 64. The blade 70 is located in a vertical plane extending longitudinally of the trough 12 and incorporating the corners 38 of the support members 34. It extends downwardly to close to these corners 38 and just above the deepest part of the slot 36.

A sheet metal cowling 74 surrounds the cutting blade 70. It comprises a pair of side plates 76 and 78, a horizontal top plate 80, a vertical front plate 82 and an inclined rear plate 84 extending at about 45° to the horizontal. The lower edges of the plates 76, 78, 80 and 82 extend below the level of the rims 30 of the side walls 24 and 26 of the trough 12 so that these edges are submerged below the surface of the water 14.

The side plate 78 is screwed on to the cowling so that it can be removed to provide access to the blade 70 for removal and replacement.

Also mounted on the chassis 52 is an enlarged nut 84 which threadedly engages the elongated screw 42. Thus as the electric motor 46 rotates, rotating the screw 42, the head 16 is moved thereby.

As mentioned above, the core splitter 10 works with a core holder 86 in which the core 88 is held during the splitting operation. The core holder 86 comprises sheet metal bent into a generally hexagonal tubular shape with its

lower sides 90 extending at right angles to one another and its upper sides 92 similarly inclined but being spaced at their upper portions to provide a longitudinal slot 94. The distance apart of the vertical sides 96 is slightly greater than the diameter of the core 88 so that it can fit snugly within the core holder 86. The lower corner of the core holder 86 is slightly above the lowest portion of the vertical slots 36.

The lower sides 90 serve both to hold the core securing in place during the cutting operation and also to locate the holder in a vertical position securely in the members 34 during the cutting operation.

Along the base of the core holder 86 are slots 98 that allow the cuttings and grindings that are generated during the cutting process to escape and accumulate at the bottom of the trough 12.

It will be appreciated that core samples exist in various sizes. Accordingly the core holders 86 will be provided in corresponding sizes to accommodate the various sizes of cores.

A control board 100 is provided, carried on one of the legs 18. It comprises operating buttons and various displays as may be required.

In use, the trough 12 is filled with water to a level slightly below the rims 30 to form a containment pond the level of which is above the level of the lower edges of the panels 74, 76 and 84 of the cowling as mentioned above. The head 16 is at or near one end of the trough 12 (as shown in full

lines in Figure 1). The core 88 is placed within a core holder 86 which then has its ends placed on the support members 34 so that (i) the core 88 is wholly below the level of the water and (ii) the core holder 86 is supported and aligned by the members 34. The motor 64 is now operated to rotate the cutting blade 70 in the direction of the arrow A in Figure 1. The motor 46 is also rotated to advance the head 15 in the direction of arrow B in Figure 1.

The cutting blade 70 engages the core 84 to cut it along a diametral plane and is moved therealong to split it along its total length. Because the engagement of the blade 70 and core 84 takes place within the pond, there will not be any, or at least much, dust or other cuttings spread from the core, this being absorbed by the water in the pond or contained within the cowling 74. Furthermore the noise caused by the cutting operation is considerably dampened, if not wholly eliminated.

The water in the pond is splashed during the cutting operation. Such splashing is contained within the cowling 74. By having the rear wall 84 spaced from the cutting blade 70 any water thrown up by the cutting blade 70 has its energy dissipated before striking the wall 84 so as not to cause damage to the wall 84.

It will be appreciated that the blade should be rotated at the correct speed for efficient cutting, so the diameter of the blade and the revolutionary speed of the water are balanced.

It will be seen therefore that the core splitting operation will be relatively quiet and clean. The cuttings and dust formed during the cutting operation will settle in the pond and can be drained though the cock 21.

Because of the direction of rotation of the cutter, on engagement with the core it tends to drag the head forward. The screw and nut arrangement serves to control the speed of movement of the head. It also serves to return the head to the initial position after completing a cutting run.

It will also be seen that should the cutter jam in the core, the core and its core holder will bend downwardly so as to escape from the support members 34 and fall to the bottom of the trough. Thus the possibility of serious damage under these circumstances will be minimised.

Furthermore if desired, the plate 32 may be carried in such a way that it can be raised or lowered depending upon the size of the core being cut and the core holder.

The invention is not limited to the precise constructional details hereinbefore described and illustrated in the drawings. If desired the water may contain a flocculant to encourage the fines to settle to bottom of the trough. The water may also be replaced by another suitable liquid if desired. Furthermore a conveying device such as a spiral conveyor may be provided at the lowest part of the trough to convey the settled matter to an outlet to clear the trough more efficiently.

Dated this 18 February 2004

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Applicant's Patent Attorneys

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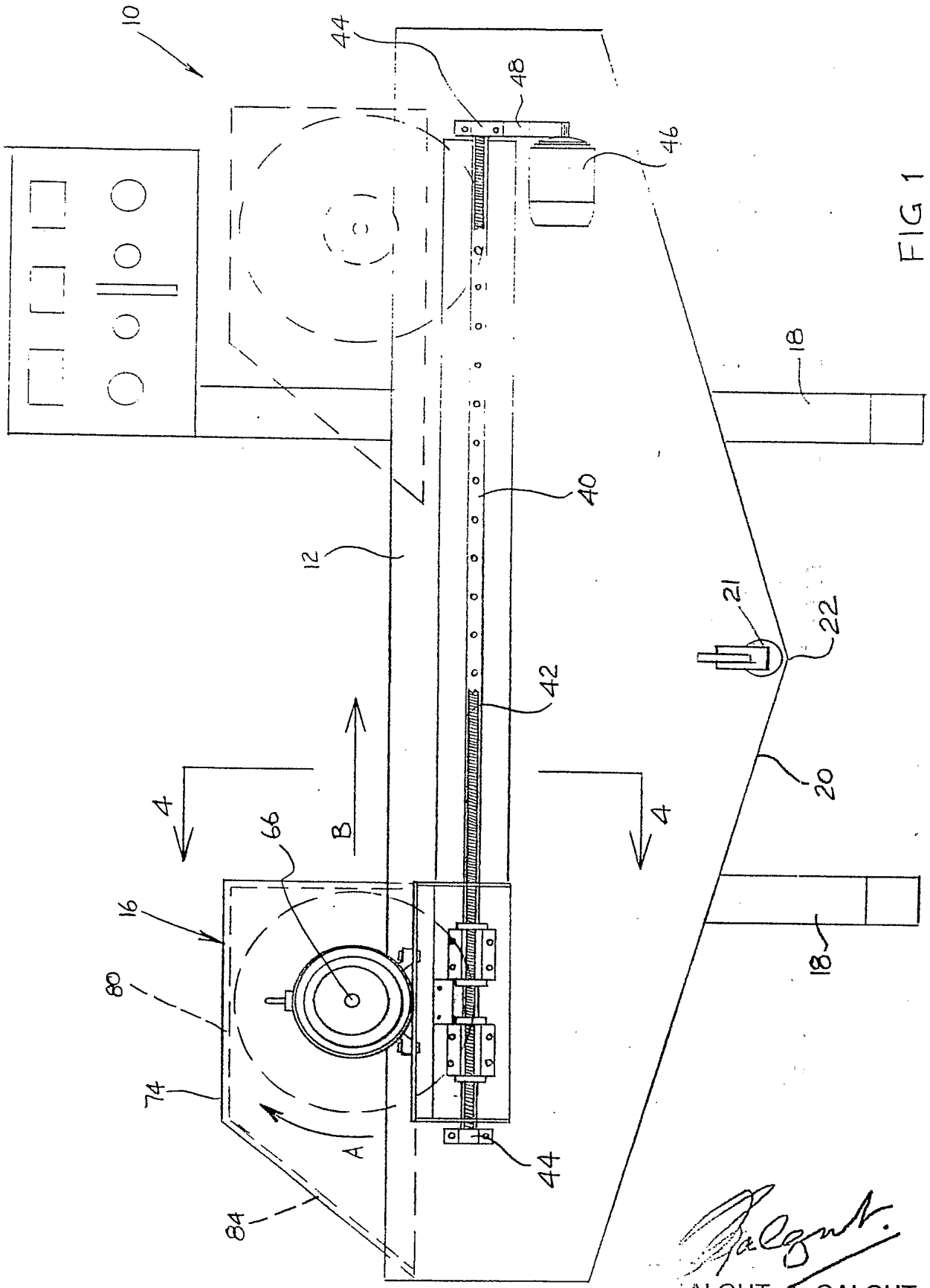

FIG 1

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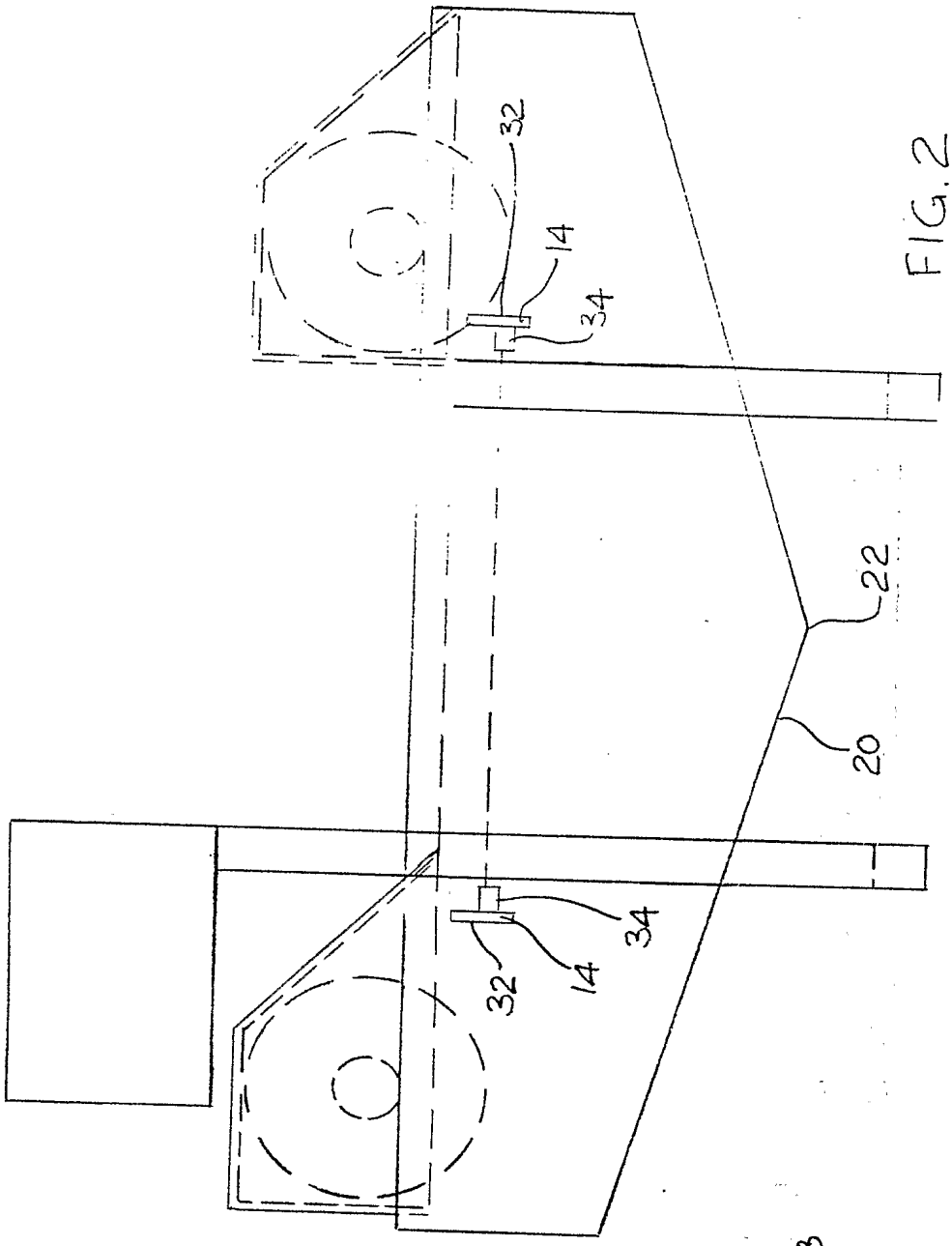

FIG. 2

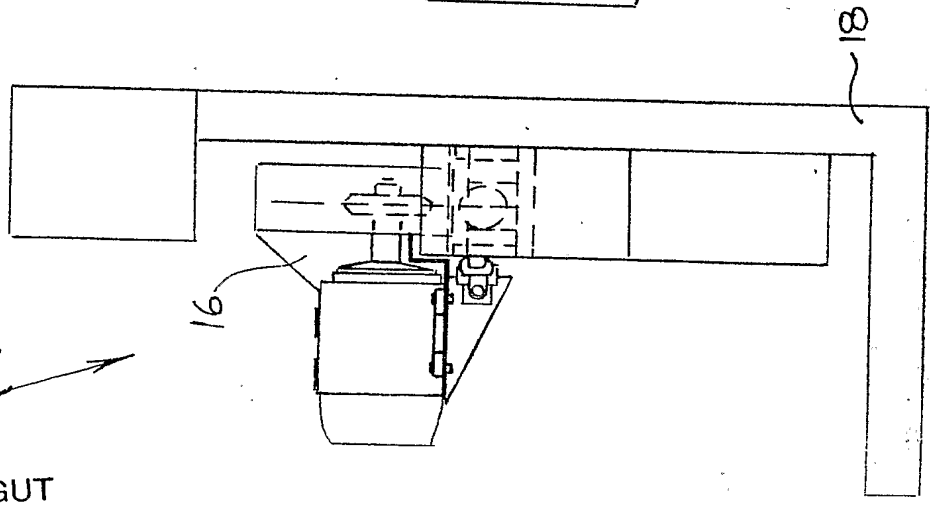

FIG. 3

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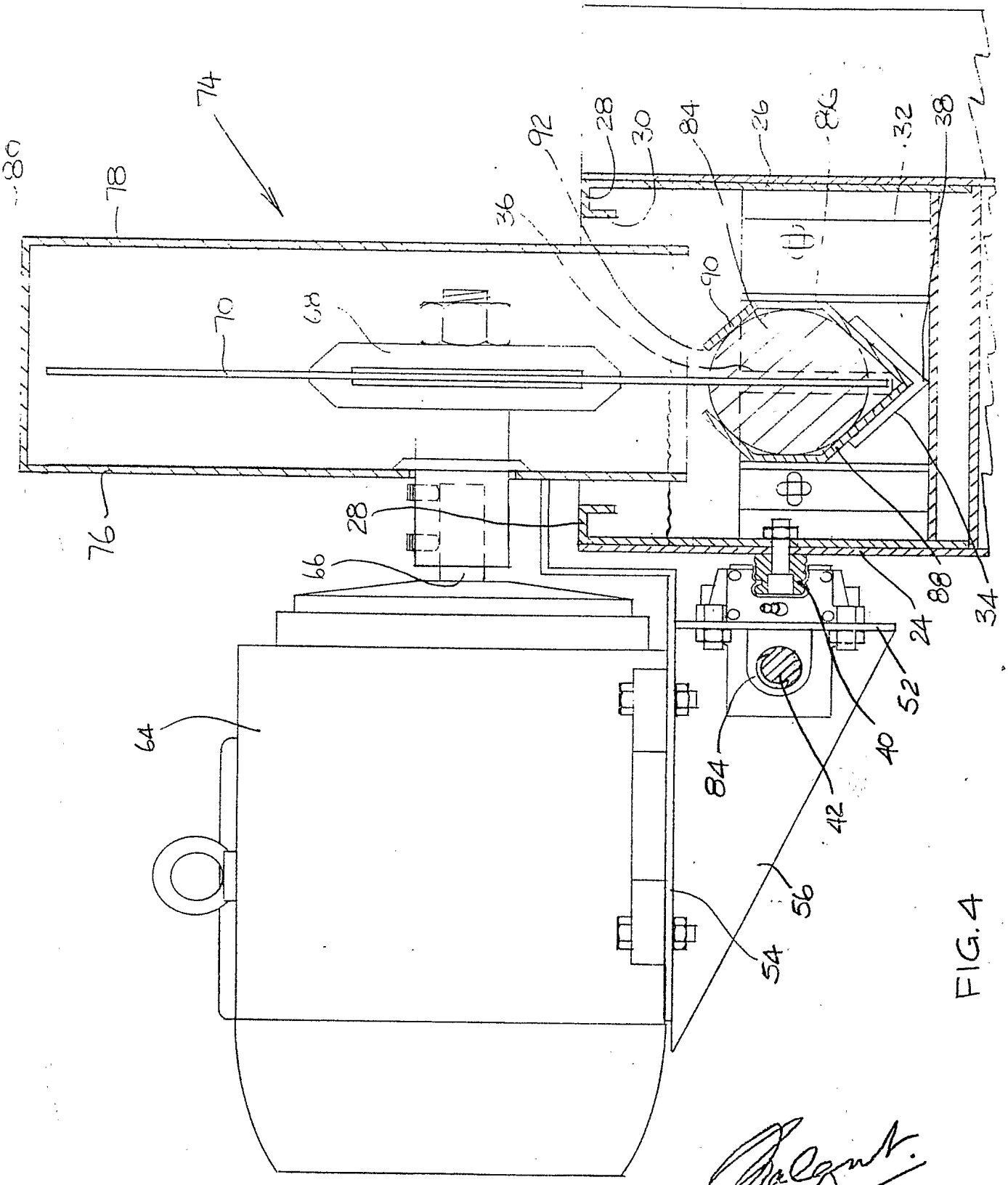

FIG. 4

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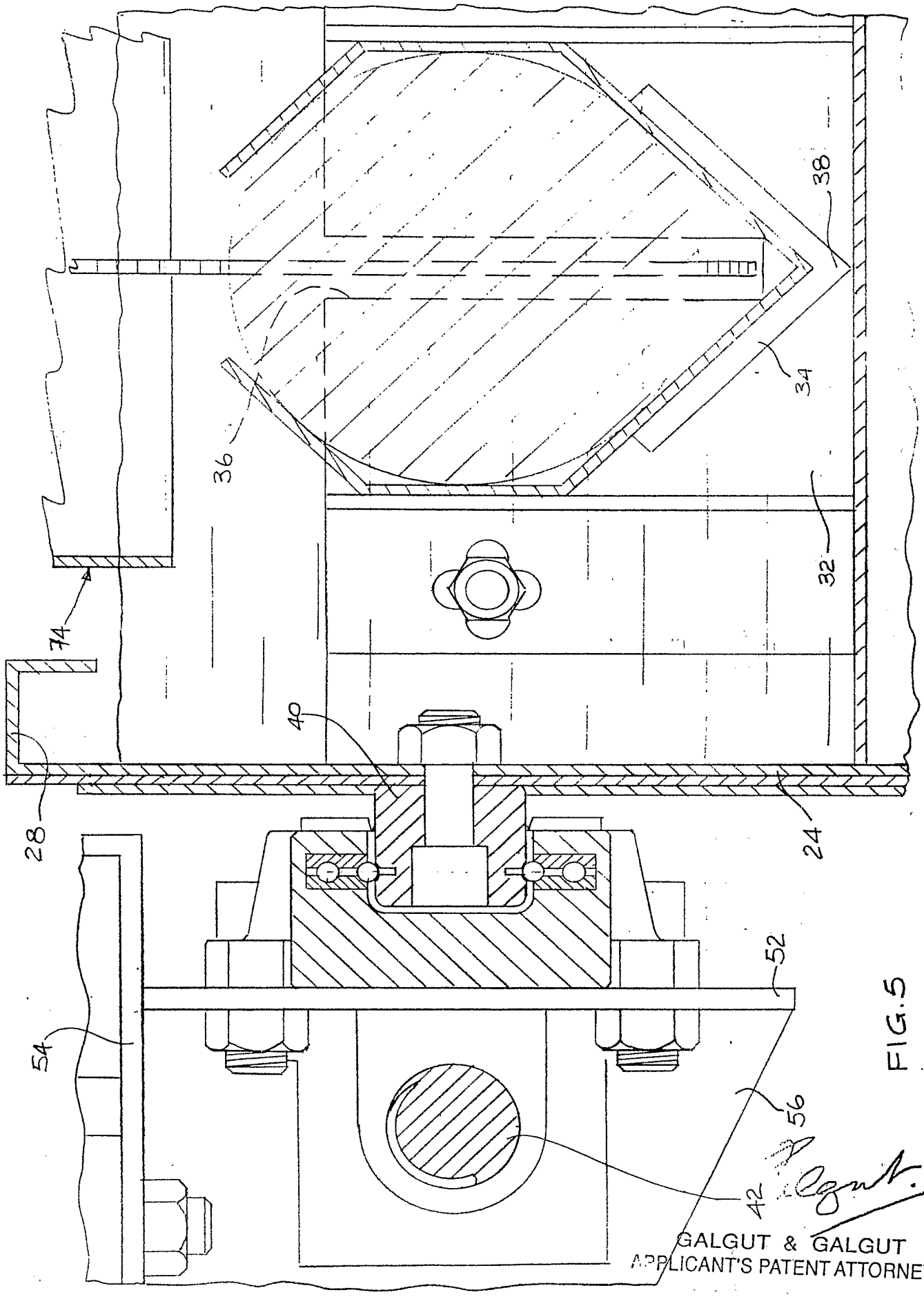

FIG. 5

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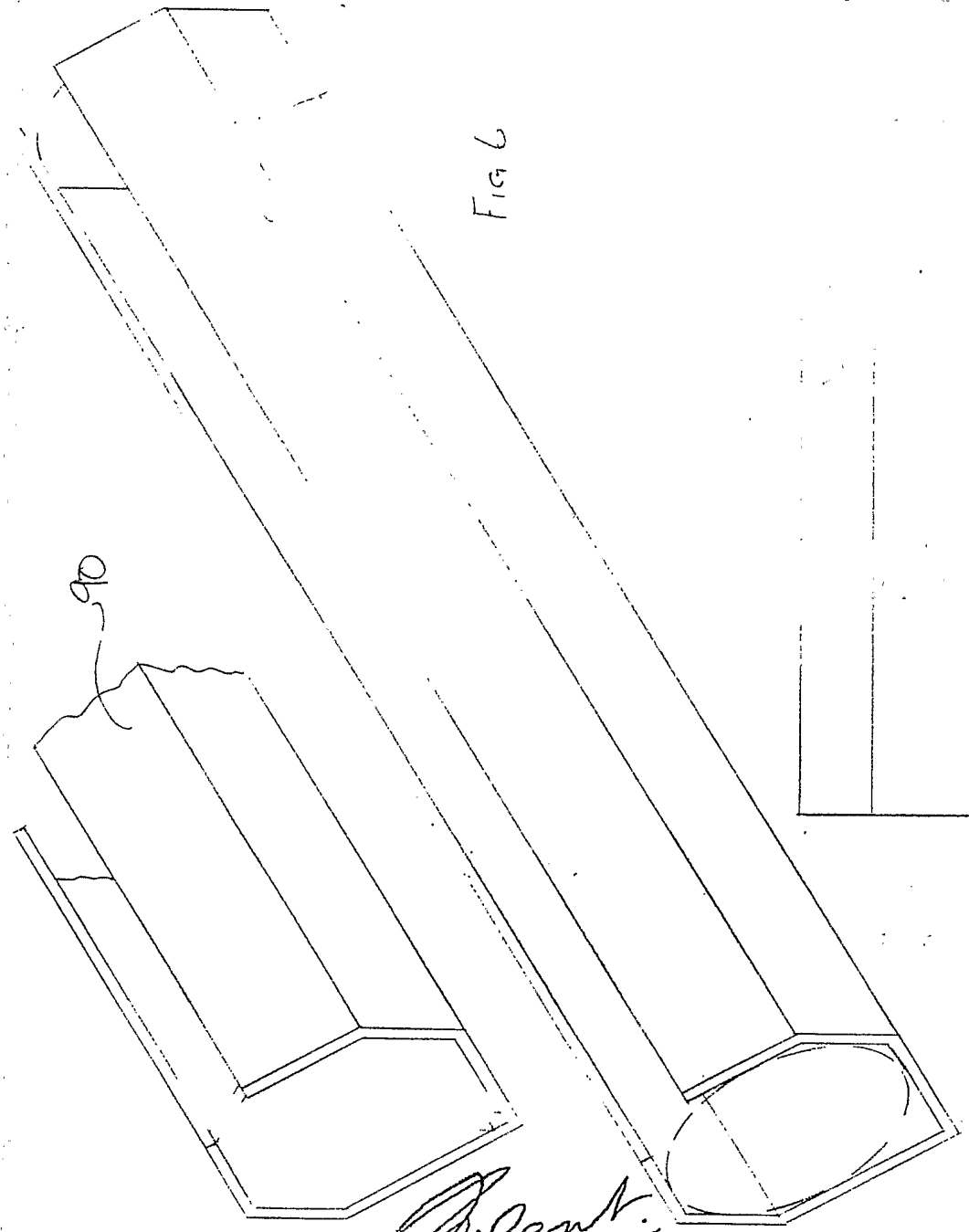

FIG 6

FIG 7

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